

What is claimed is:

1. A linear amplification with nonlinear components (LINC) power transmitter, comprising:
  - a digital signal processing unit which controls the LINC power transmitter;
  - 5 a frequency modulation unit which modulates or converts a digital signal output from the digital signal processing unit into a radio-frequency (RF) signal;
  - a signal amplification unit which amplifies the RF signal output from the frequency modulation unit using a gain amplifier and a power amplification module; and
  - 10 a direct current/direct current (DC/DC) conversion unit which controls bias of the power amplification module,  
wherein the DC/DC conversion unit controls a base bias and/or a collect bias of the power amplification module, and the power amplification module operates in saturation.
- 15 2. The LINC power transmitter of claim 1, wherein the digital signal processing unit comprises:
  - a signal component separator which separates a predetermined signal into its components;
  - 20 a local oscillator controller which controls a local oscillator of the frequency modulation unit; and
  - a bias/level controller which controls the base bias signal and the collect bias signal to be provided to the signal amplification unit.
- 25 3. The LINC power transmitter of claim 1 or 2, wherein the frequency modulation unit comprises:
  - a digital/analog (D/A) converter which receives a digital signal output from the signal component separator and converts the received digital signal into an analog signal;
  - 30 a low pass filter which only passes a low frequency signal among analog signals output from the D/A converter;  
a quadrature modulator which quadrature-modulates a signal output from the low pass filter; and

a local oscillator which provides an oscillation signal to operate the quadrature modulator.

4. The LINC power transmitter of claim 3, wherein the signal amplification unit comprises:

5 a gain amplifier which amplifies gain of a signal output from the quadrature modulator;

a power amplification module which amplifies a signal output from the gain amplifier using the base bias and collect bias of the DC/DC conversion unit; and

10 a signal combiner which combines output signals from the power amplification module.

5. The LINC power transmitter of claim 4, wherein the power amplification module comprises a power amplifier corresponding to the gain amplifier and is a commonly-used amplifier or a differential amplifier.

6. The LINC power transmitter of claim 4, wherein the DC/DC conversion unit comprises a DC/DC converter which is controlled by the bias/level controller of the digital signal processing unit, provides the base bias and the collect bias to the power amplification module and adjusts an output level of the power amplification module by bias control.

7. The LINC power transmitter of claim 1, wherein the power amplification module comprises a virtual ground for removing a predetermined error signal.

25 8. The LINC power transmitter of claim 7, wherein the power amplification module further comprises an impedance matching load which is connected to the virtual ground and removes the error signal.

30 9. The LINC power transmitter of claim 1 being able to be applied to a software defined radio (SDR) power transmitter which changes communication modes using software.